

**Agenda for Visit of
Dr. Kathie L. Olsen**

**NASA Chief Scientist
and
Acting Associate Administrator
Office of Biological and Physical Research**

December 4 , 2000

1:00 B-1219 Brown Room	Arrival Welcome and Overview of Langley	Creedon
2:00 B1250	Atmospheric Science <ul style="list-style-type: none">- Overview- PICASSO-CENA- LaRC Ozone Research Program	Levine/Sanford Winker Zawodny
3:00 B1293B R135	Structures & Materials Lab <ul style="list-style-type: none">- Overview- Biologically Inspired Smart Nano Technology (BIOSANT)- Astronaut Radiation Protection- Mars Sample Return- Morphing	Shuart Siochi Wilson Jones Horta
4:00	Departure	



PICASSO-CENA

**David Winker
Principal Investigator**

NASA Langley Research Center



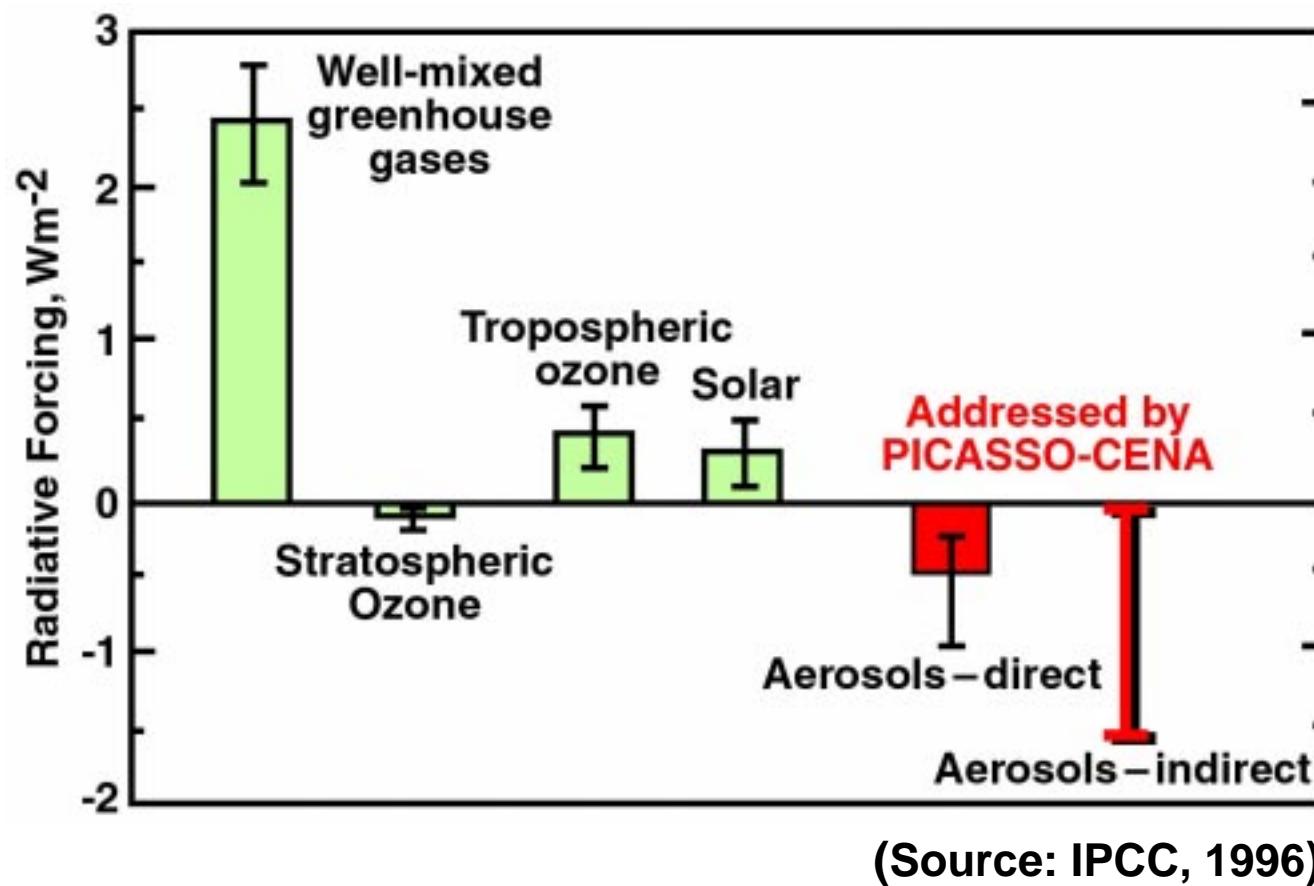
Science Rationale





Estimated Radiative Forcings

Aerosol forcing counters the warming due to greenhouse gases.

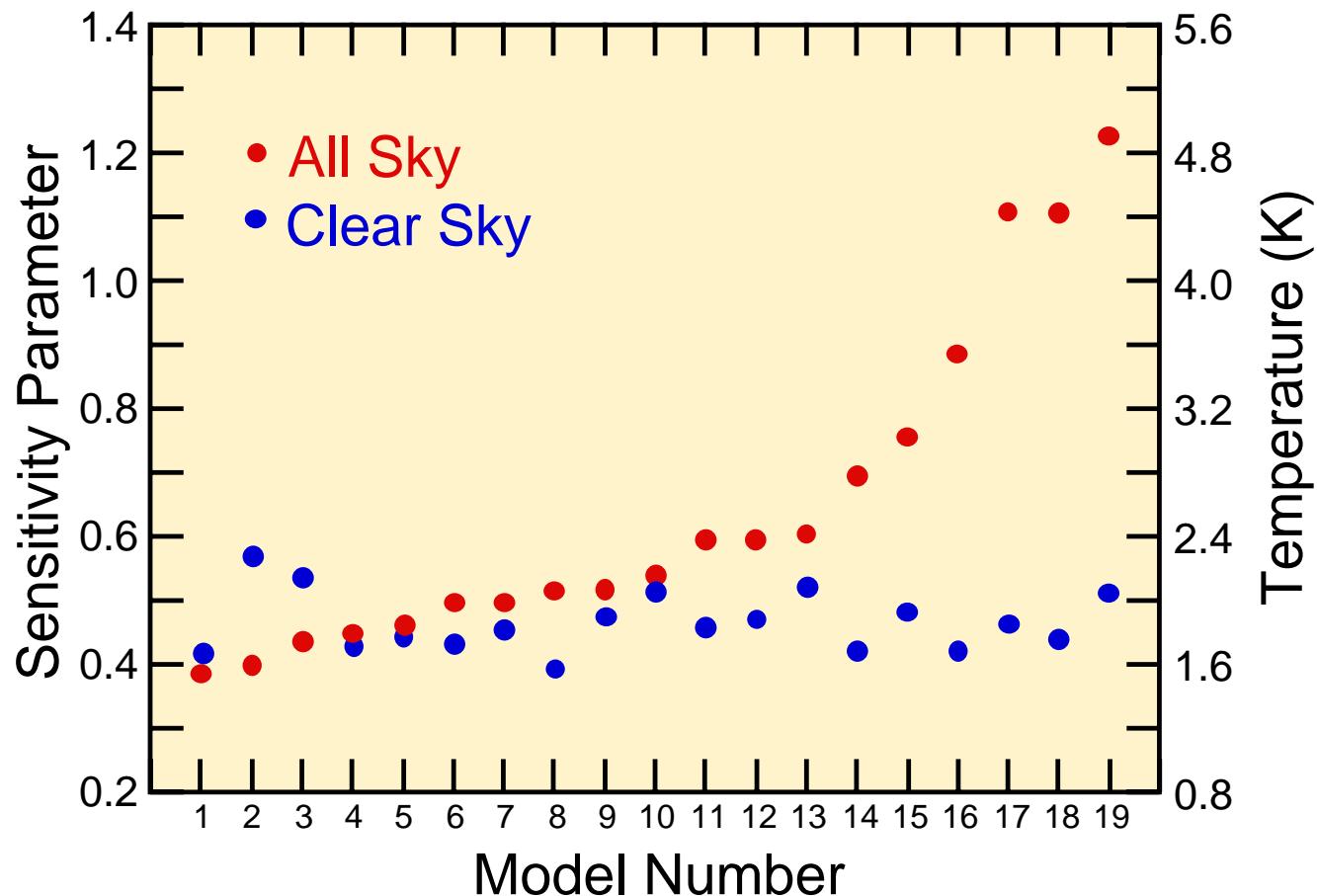


Currently, the magnitude and uncertainty of aerosol forcing is determined from models, not observations.



Clouds Affect Climate Sensitivity

*Climate models are inconsistent in predicting
the effects of clouds on climate.*



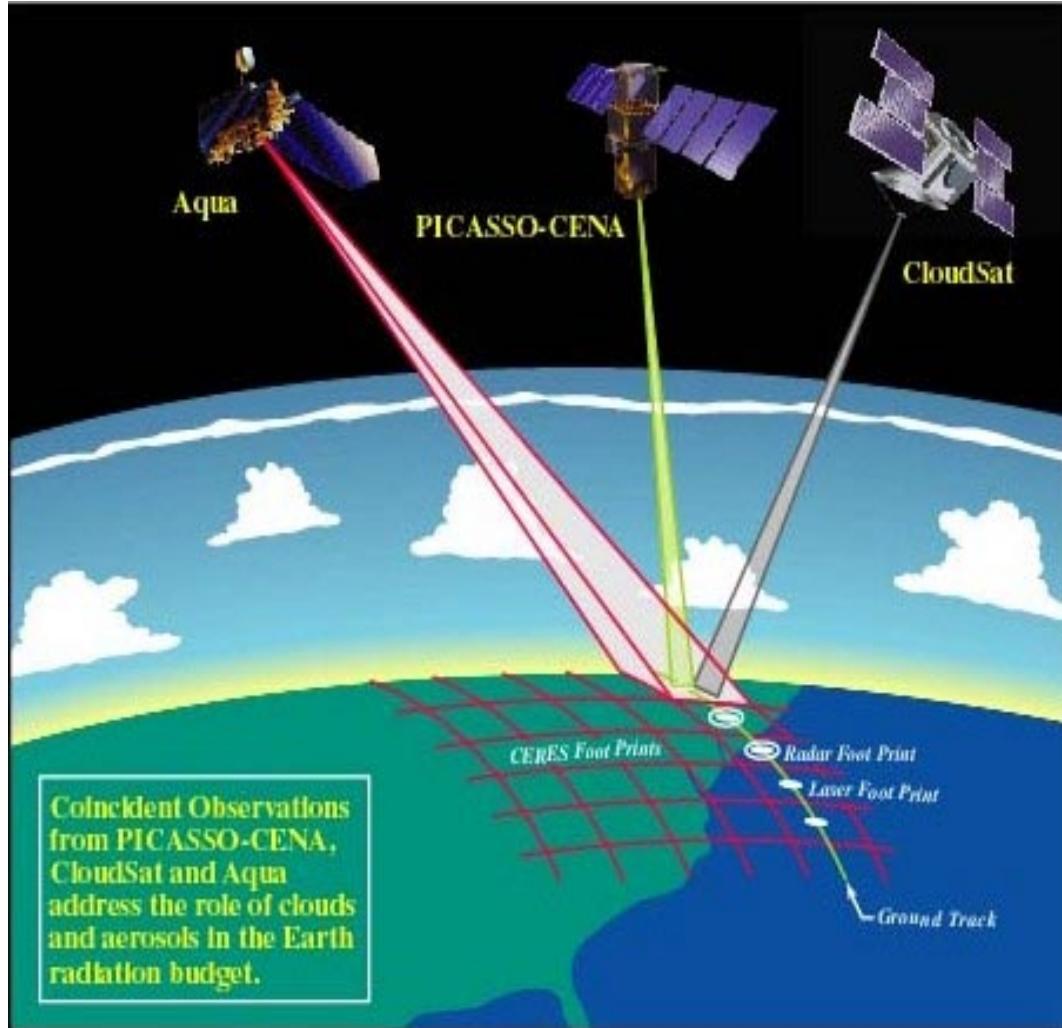


PICASSO-CENA provides unique observations of clouds and aerosols that will allow:

- Observation-based assessments of direct and indirect aerosol effects
- Monitoring the long-range transport of pollutants
- Improved parameterizations of clouds and aerosols in climate models
- Improved estimates of surface and atmospheric radiative fluxes
- Improved validation of passive satellite instrument techniques



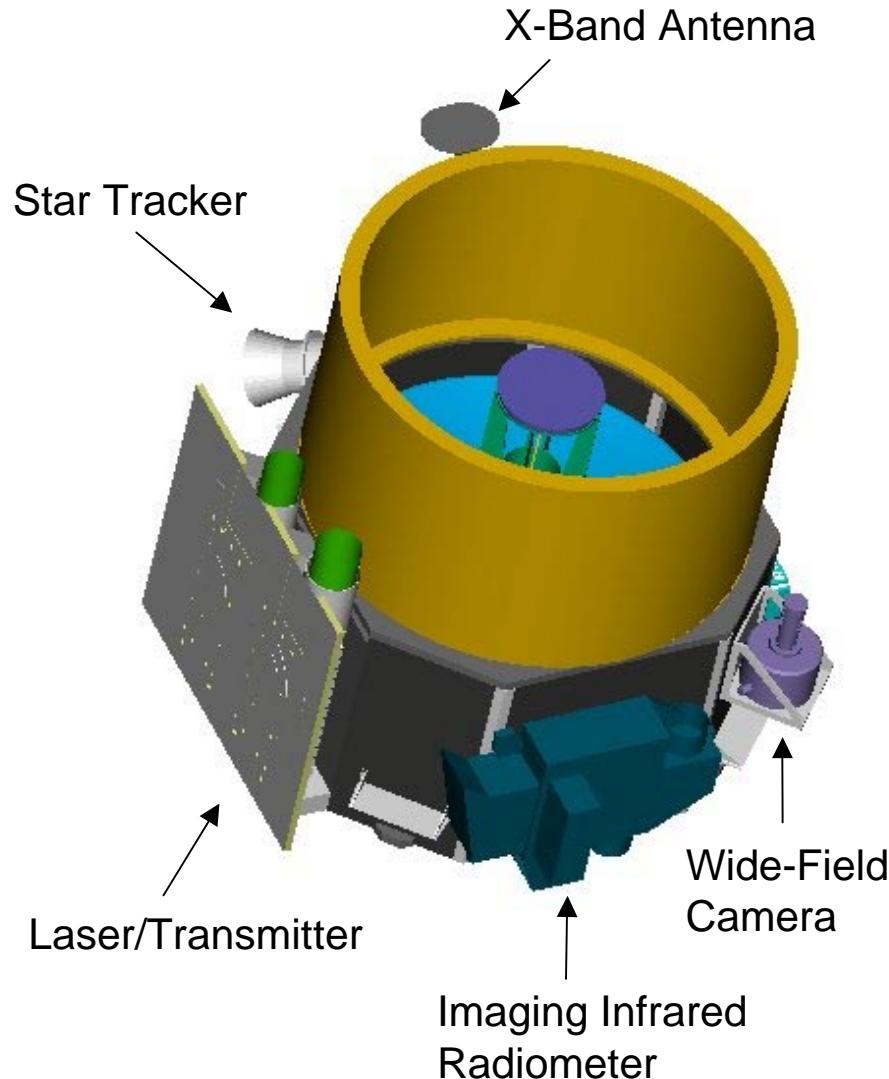
Mission Concept



- One spacecraft with three science instruments:
 - Three-channel lidar
 - 532 nm // vertical distribution of clouds/aerosols
 - 532 nm \perp
 - 1064 nm
 - Imaging IR radiometer
 - Wide-field camera
- Orbit: 705 km, 98.08 inclination, in near formation with Aqua, Equator crossing time: BOL14:04, EOL 12:56
- Launch in 2004
- Mission duration: 3 years



Nominal Instrument Characteristics



Lidar

Laser	Nd: YAG, 2x110 mJ
Wavelength	532 nm, 1064 nm
Repetition rate	20.25 Hz
Receiver telescope	1.0 m diameter
Polarization	532 and ⊥
Vertical resolution	30 m
Horizontal resolution	333 m

Wide Field Camera (WFC)

Wavelength	645 nm
Spectral bandwidth	50 nm
IFOV	125 m
Swath	60 km

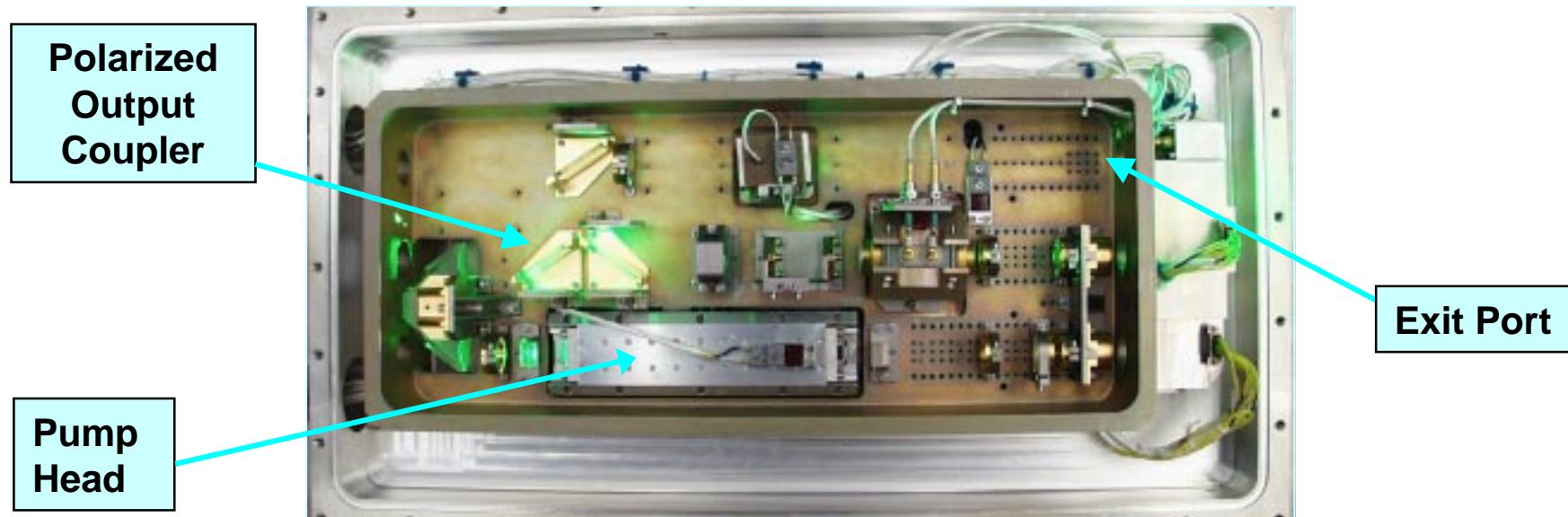
Imaging Infrared Radiometer (IIR)

Wavelength	8.7, 10.5, and 12.0 μm
Spectral resolution	0.8 μm
IFOV	1 km
Swath	64 km



Risk Reduction Laser

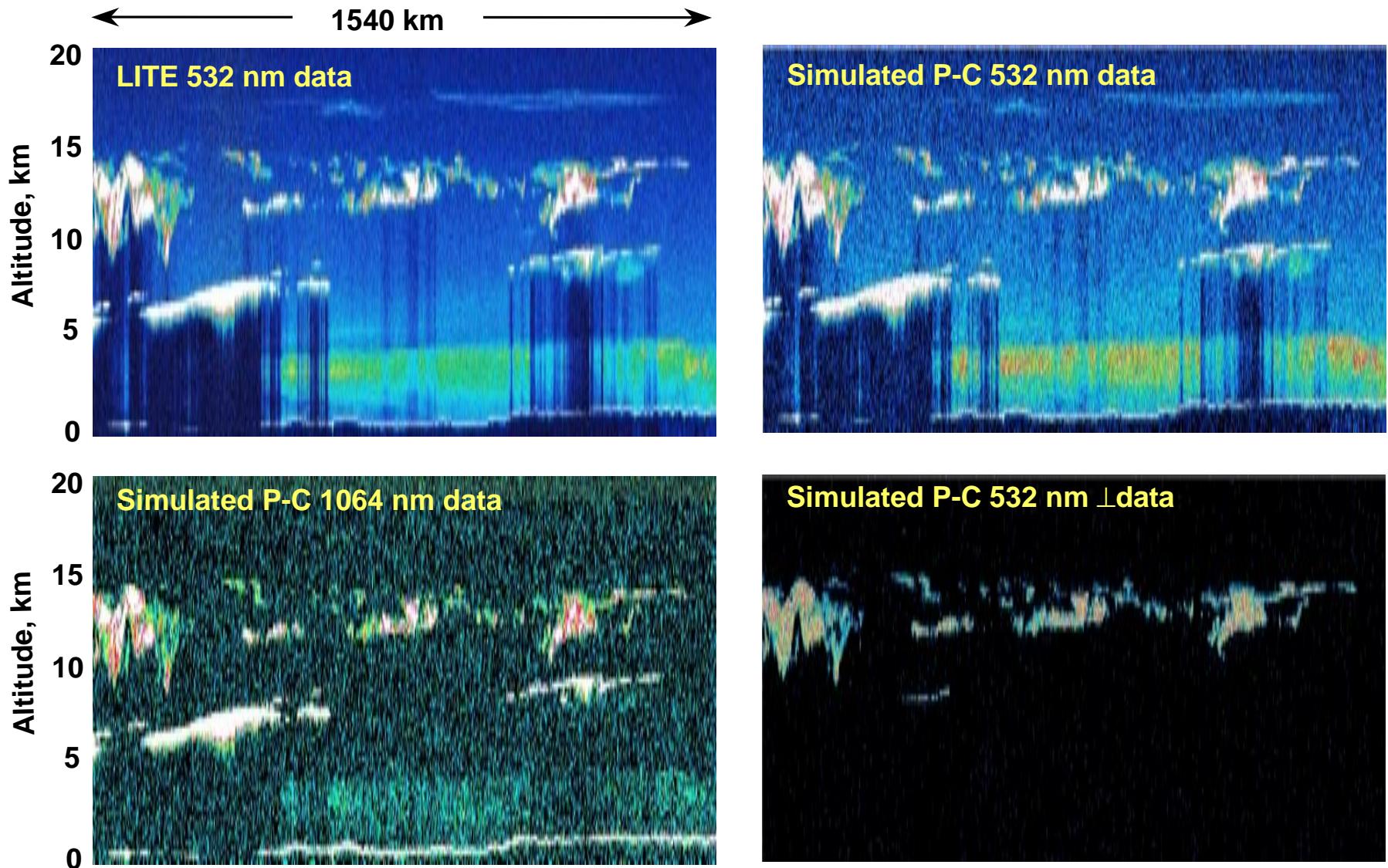
RRL demonstrates a flight-worthy laser configuration.



- Meets all basic performance specifications of flight laser.
- Validates contamination control procedures.
- Continuous operations began September 1998, 1.6 billion shots as of November 2000 (90% of mission life)

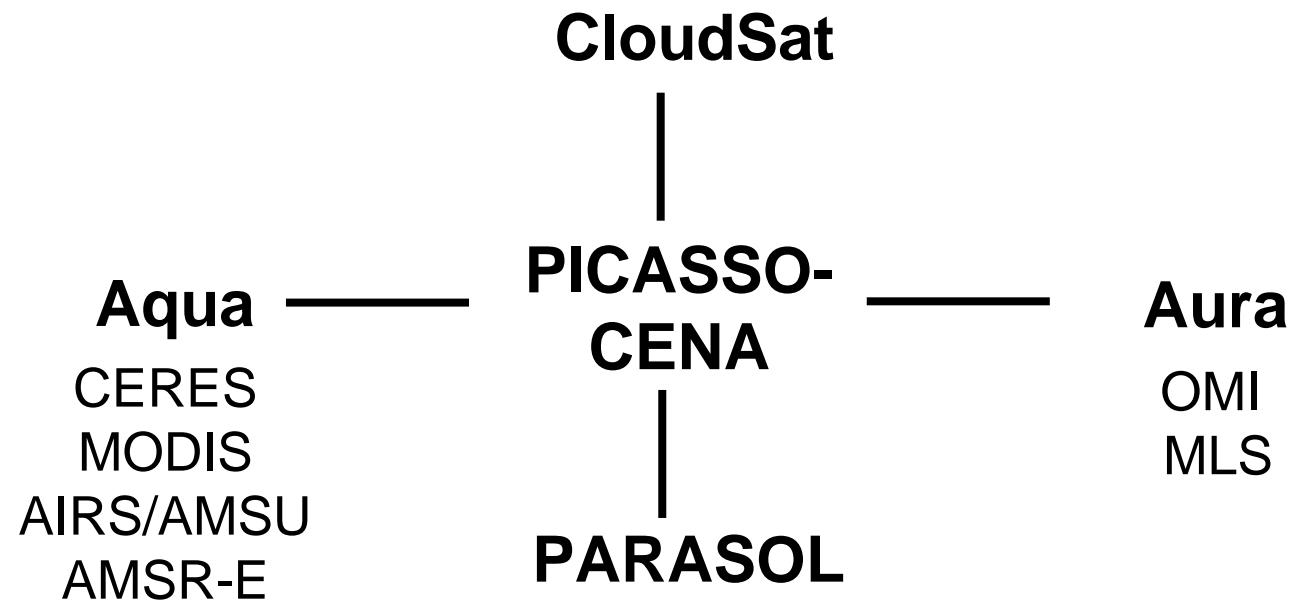


LITE and Simulated P-C Observations





PICASSO-Constellation Synergies

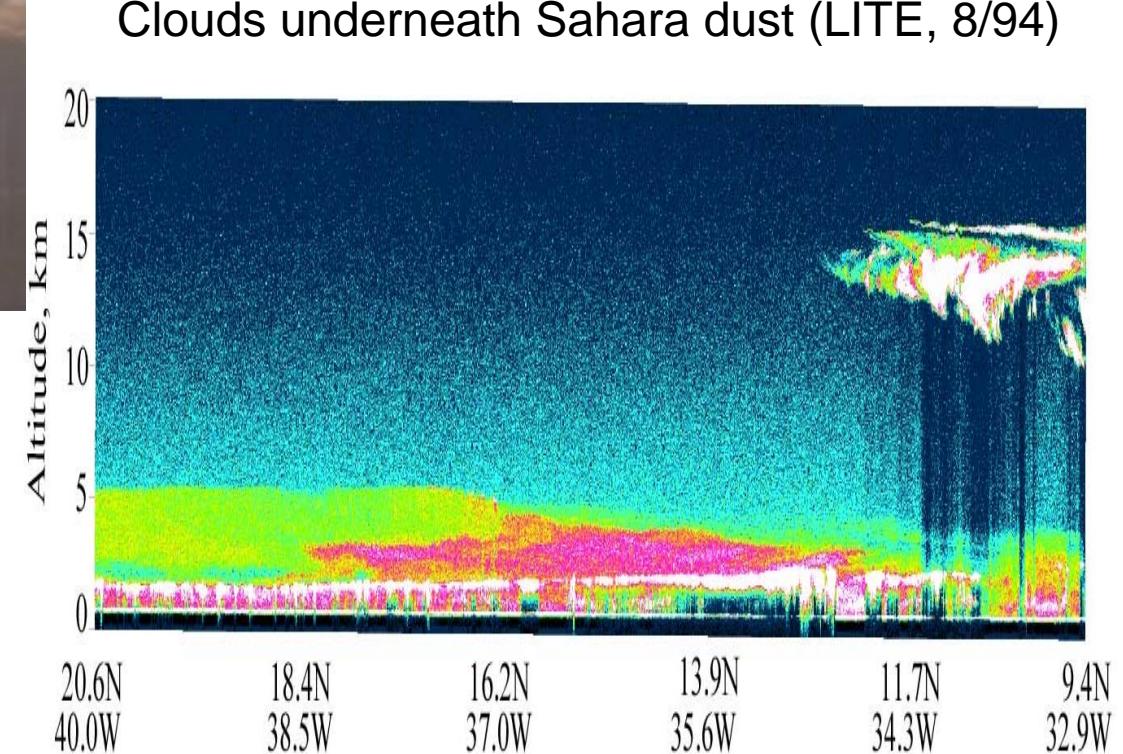




Aerosol-Cloud Interactions



Aerosols affect cloud formation and properties

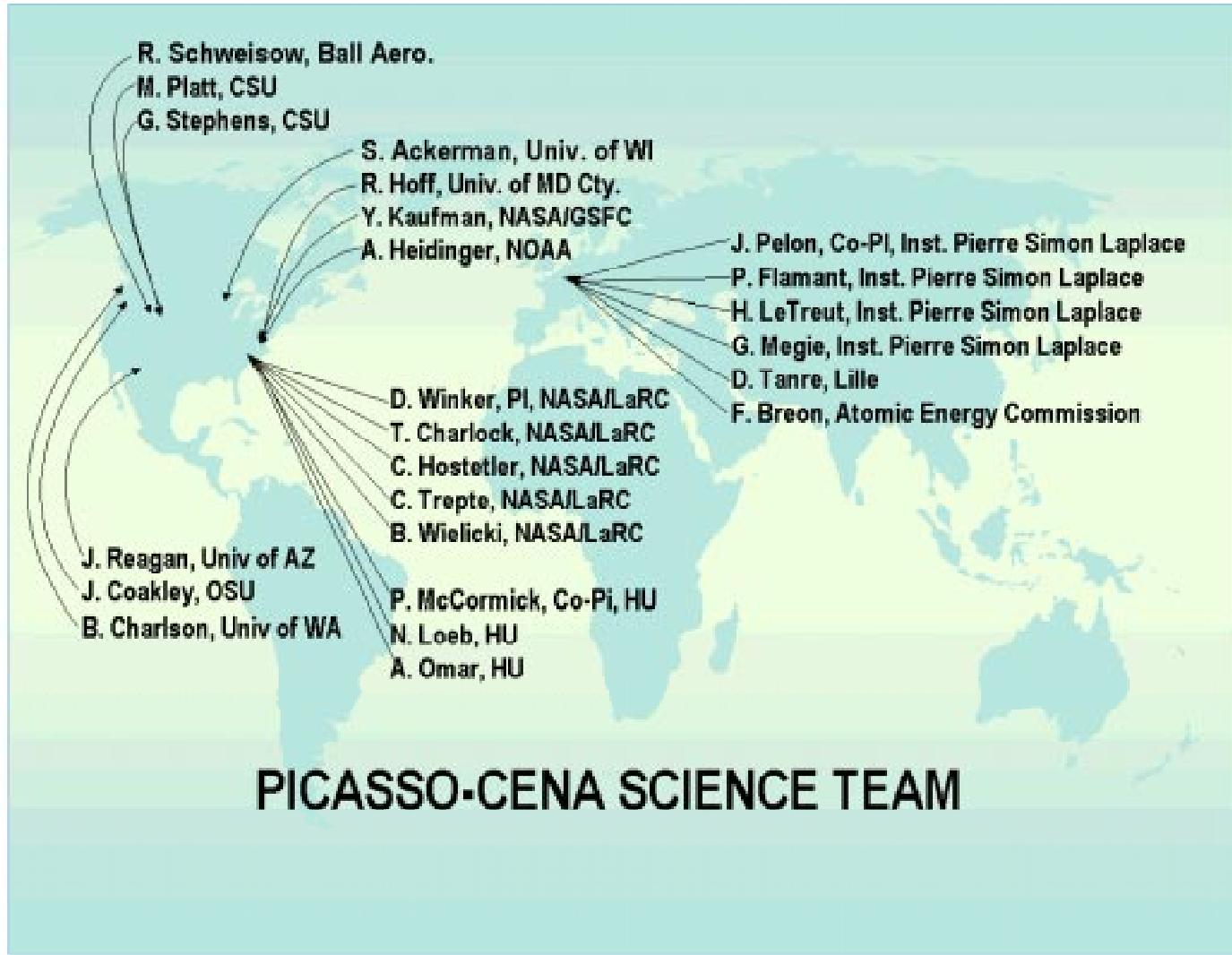




Aerosol-Cloud Interactions

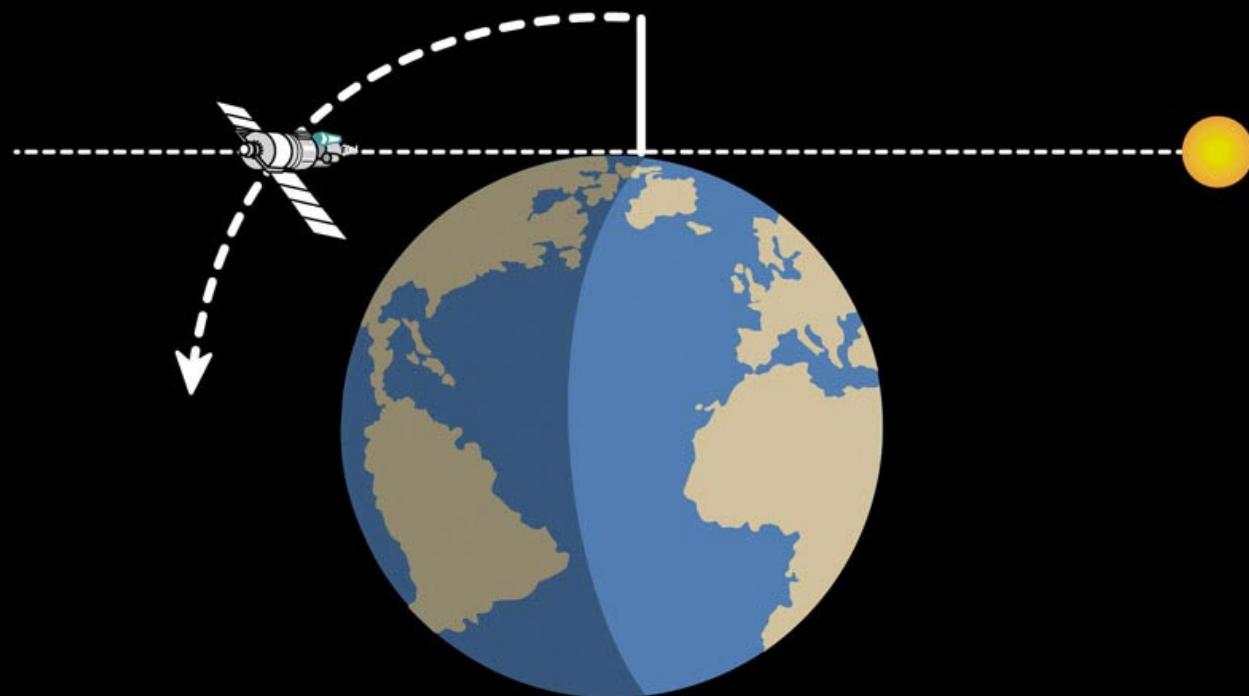
MEASUREMENT	PICASSO-CENA	AQUA	CLOUDSAT
cloud/aerosol profiles	lidar		
aerosol optical depth	lidar		
cloud-clearing	lidar + WFC		
cloud albedo		MODIS	
cloud droplet size		MODIS	
radiative fluxes		CERES	
presence of drizzle			CPR

- constellation synergies





Solar Occultation

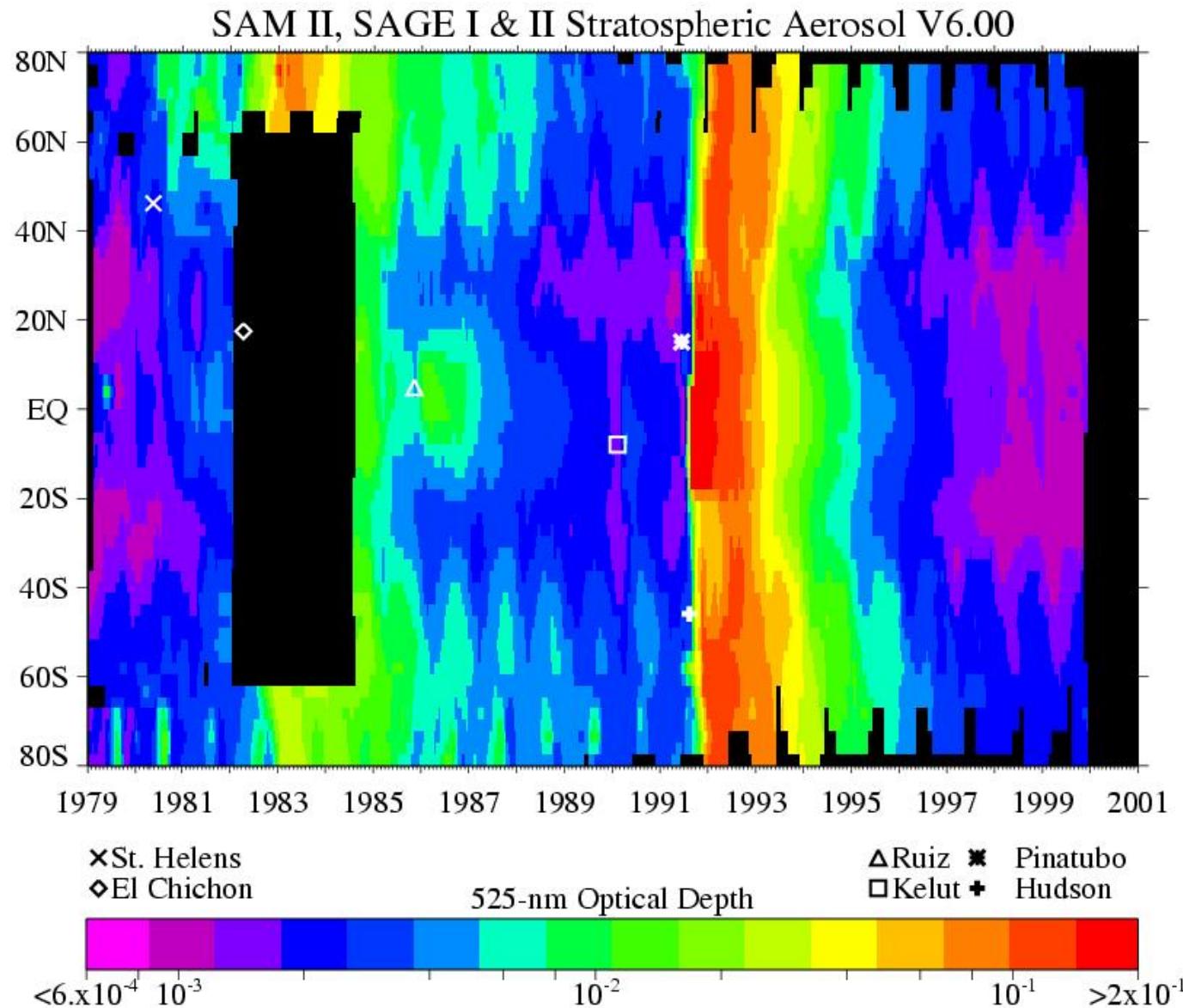


PM-SolarOccultation-12/96

J. M. Zawodny: 12-4-2000; NASA LaRC



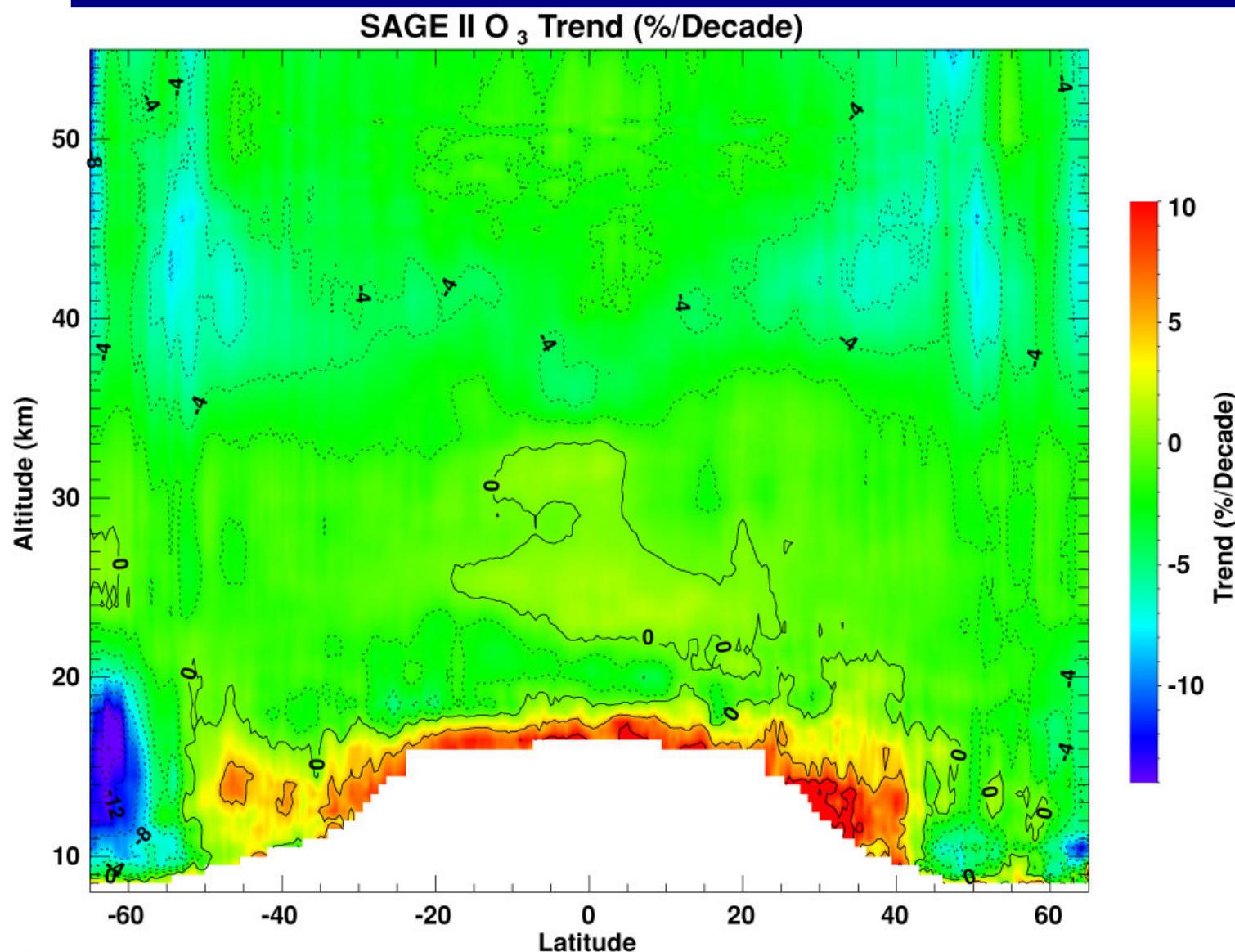
1000-nm Stratospheric Aerosol Optical Depth



J. M. Zawodny: 12-4-2000; NASA LaRC

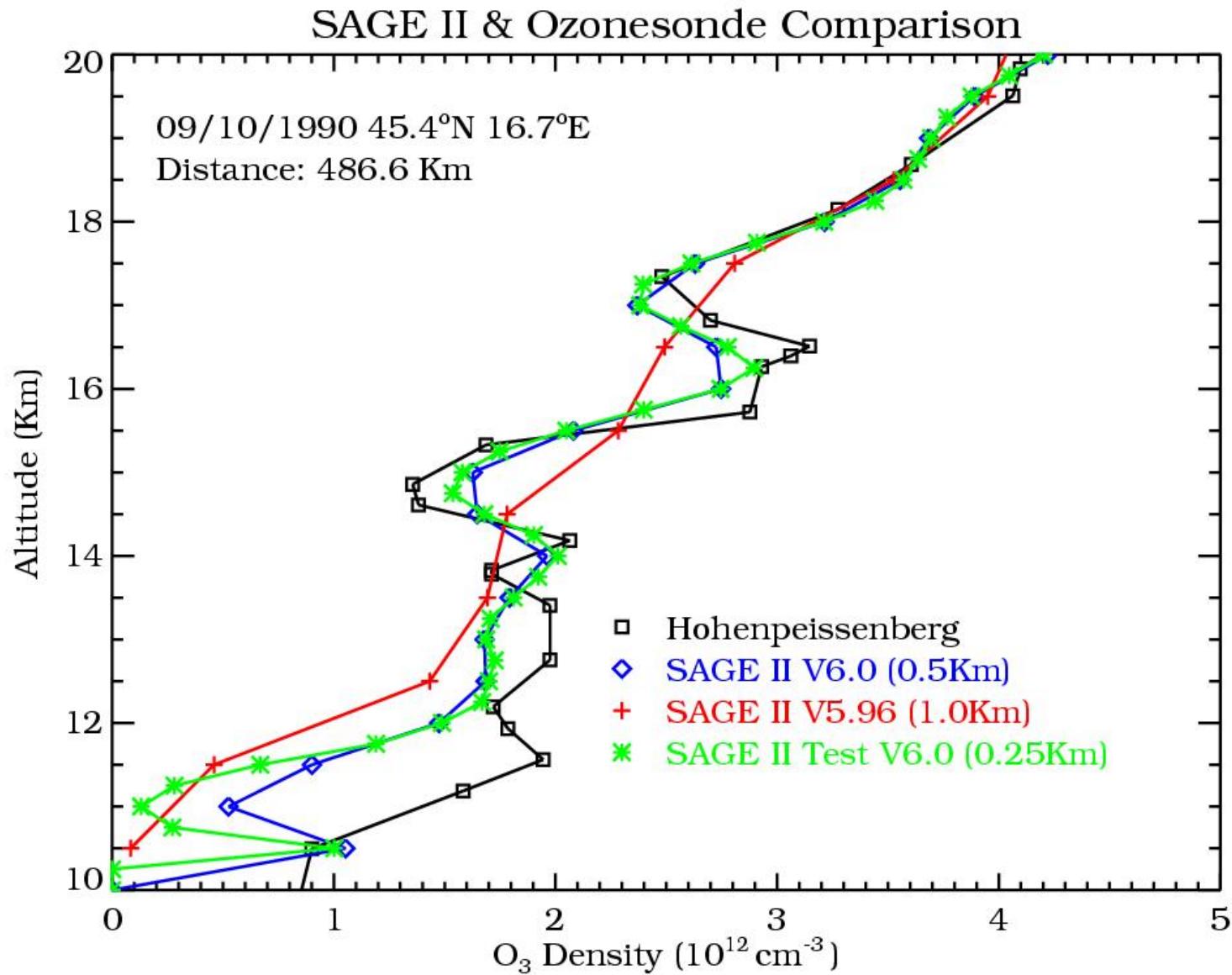


Ozone Trend October 1984 - April 2000



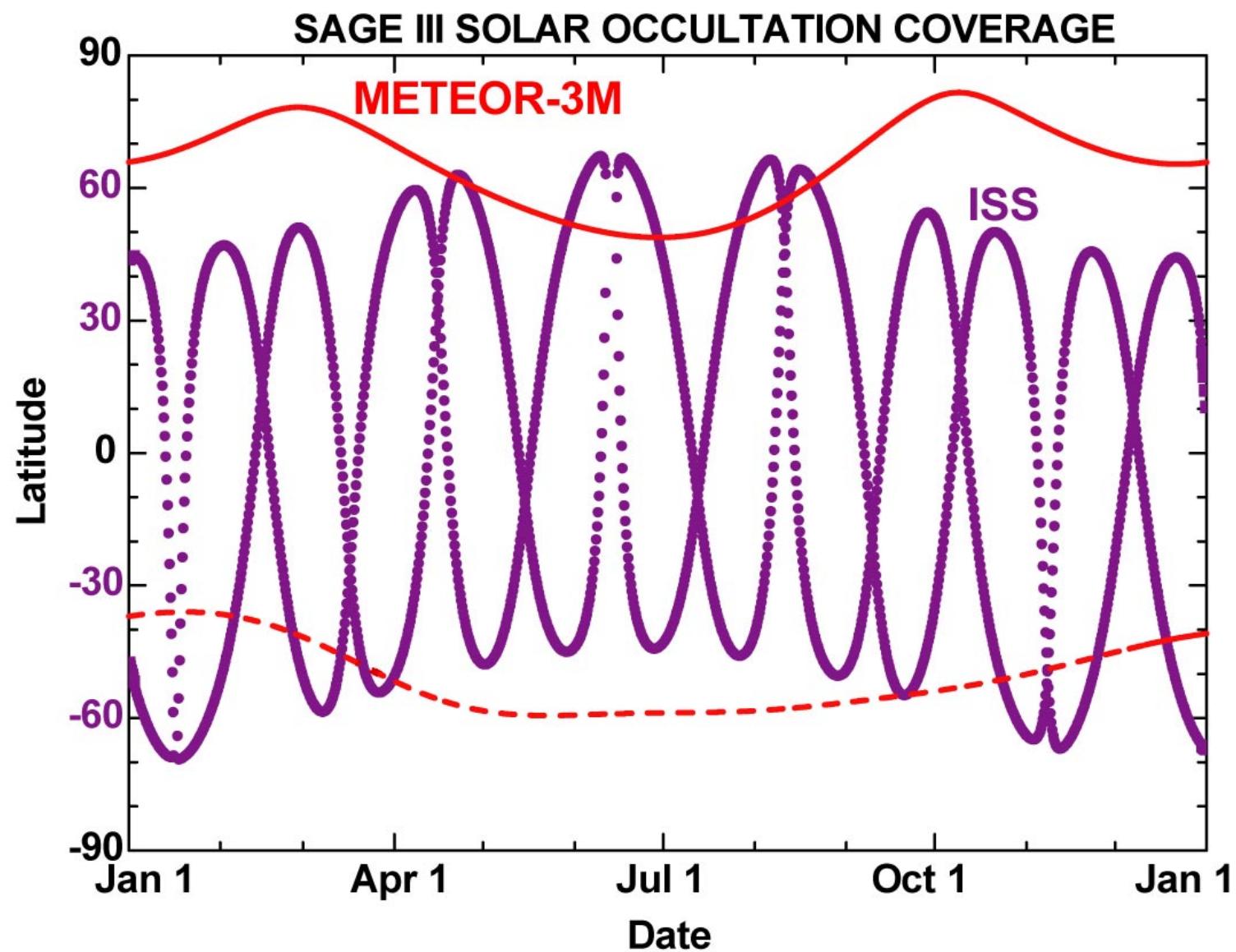


Occultation Algorithm Improvements



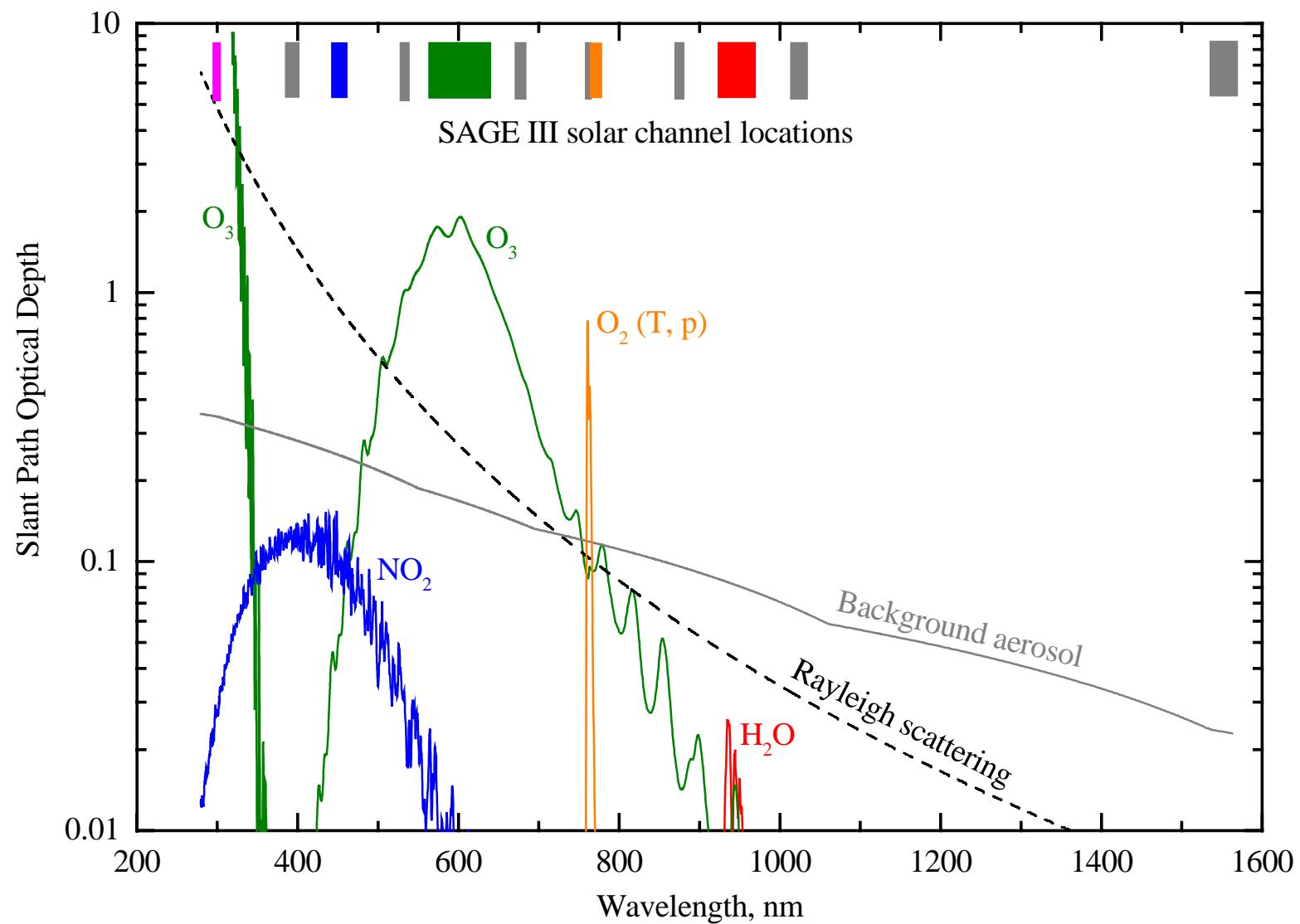


SAGE III Coverage (METEOR & ISS)





Slant Path Optical Depth at 20 Km





Technology Development for Future Sensors

